Scenario ID	128
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Reviewers	S. Panacek
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Accepted	
Goal	Participating in a beam study on the LHC
Level	High
Actors	Fermilab Beam Physicist Fermilab Operations Specialist LHC Beam Physicist LHC Operations Specialist
Trigger	Time has been allocated to perform a beam study, electron cloud effects, in the LHC. The study plan is to measure the instability threshold due to the electron cloud as a function of chromaticity and bunch intensity at injection and at 7 TeV. A Fermilab Beam Physicist is collaborating with the LHC Beam Physicist on this project, and is eager to participate directly.
Narrative	The study begins at 1900 GMT (1300 Fermilab time and 2000 CERN time) with a meeting with all interested parties to determine the details of how to perform this measurement. A video conference connects the LHC Central Control Center (CCC) with the Remote Center at Fermilab (RCF). It is decided that the measurement will cover: two energy points, five chromaticity points (0, +/- 1 and +/- 2 units), and 3 beam intensity points (0.1E11 protons per bunch, 0.5 E11 and 1 E11). This is a total of 30 measurements. At 1945 GMT, the LHC Operations Specialist sets the permissions on the appropriate application programs for accessing the measurement progress so that the RCF can watch the progress (read only) of the measurements. The video conference connection is terminated, but they resume contact through an instant messaging channel. The LHC Operations Specialist initiates the first measurement for injection, 0.1 E11 beam intensity, and nominal chromaticity. Data are collected and the Fermilab Beam Physicist receives the data. The other chromaticities are dialed in at the CCC and data are collected. All the injection measurements go smoothly. At the end of each measurement, the CCC sends a message to the RCF stating that the measurement has finished and asks if there are any problems. The LHC Operations Specialist makes a log entry at the beginning and at the end of each measurement. The Fermilab Beam Physicist adds to each entry with a comment on the data quality after each

	measurement is completed. An instant message is sent from the RCF to the CCC confirming the quality of the data collected at the end of each measurement; the CCC will not proceed with the next measurement until this confirmation is received. The 7 TeV measurements proceed much more slowly. At 0030 GMT, the LHC Beam Physicist is called away on a personal matter. They decide to continue the experiment, as the LHC Operations Specialist is very familiar with this measurement. The people at the RCF continue their role as observer, but now with the understanding that they must very carefully monitor the progress. On the seventh point at 7 TeV (0.5 E11, -1 units of chromaticity), the Fermilab Operations Specialist notices an anomaly in one of the beam pickups. She sends an instant message labeled as "urgent" to the CCC quickly requesting that the measurement be paused due to a possible pickup error. They quickly respond by calling the RCF to verify this comment. The Fermilab Operations Specialist says that the monitor at the "gamma" location at LHC is showing signs of saturation. [Not sure about this technical detail! –EM.] The LHC Operations Specialist confirms that the local controller for this monitor is showing bad status, which has led to the bad readback. This local controller is rebooted by the LHC Operations Specialist and the measurement proceeds. All the data are collected by 0435 GMT. Since the measurement has gone smoothly, the Fermilab Beam Physicist has been able to analyze the data simultaneously. He notices that there is a problem, still, with the seventh measurement at 7 TeV and requests, via an instant message, to repeat that measurement. The LHC Operations Specialist confirms this request by telephone and repeats the measurement. The final measurement is completed at 0509 GMT. The LHC Operations Specialist removes the privileges granted earlier to the RCF to tap into the data collection program. The LHC Operations Specialist notes this in the log. Full data analysis continues at the RCF through the night. At 1800 GMT, the final results are posted from the RCF as a technical memo. The LHC Beam Physicist downloads this technical memo and reviews the results.
Exceptions	
Comments	The actors used here are symbolic of a larger group. The "Operations Specialists" probably represent a changing operations crew. Also, the Fermilab Beam Physicist is almost certainly several people—it is likely that in this scenario there would be a shift change at least once, maybe twice, within this process.